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ABSTRACT

The process for the certification of teachers has changed over the years reflecting a transition in the qualifications and background required from a teacher. A common requirement in all States for vocational teachers is actual occupational employment and, in Pennsylvania, an additional requirement is the completion of the occupational competency examination. To determine whether occupational competency evaluation scores are a valid indicator of subject competency, a five-year study of 107 full-time vocational teachers was conducted. Data were collected using a 17-item questionnaire designed to measure subject matter competency of teachers through ratings by their supervisors. An 86 percent return resulted. Occupational competency evaluation scores were obtained from the files in the Department of Vocational Education of the Pennsylvania State University. Relationships between performance scores and supervision ratings were correlated. Results are tabulated and discussed. The occupational competency areas in carpentry, drafting, electronics, and machine shop were correlated and tabulated according to performance, written portion of the occupational competency evaluation, and supervisors' ratings. The fact that no evidence of a relationship between occupational competency evaluation scores, subject competency, and supervisors' ratings was found is discussed. Bibliographies and the instrument used are appended. (EC)

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NON-PEDAGOGICAL COMPETENCIES OF TEACHERS

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Chapter I

INTRODUCTION

Background Information

Origins for teacher certification have been traced to the middle ages. During this period, the certification of teachers or license to teach was controlled by the church. The completion of a successful period of study would permit the graduate to have conferred upon him such a license or degree:

> Since all teachers in the Middle Ages were clerics and since it was felt that all clerics should be trained properly in religious orthodoxy as well as in the tools of scholarship, the church found it expedient to control entrance into the teaching profession. This was done by granting a license to teach (licentia docendi), the condition for receiving which was the successful completion of the course in the liberal arts. Before the rise of the university system, the licentia was granted by the bishop or chancellor of the cathedral schools, but, with the spread of university organization, the license, or degree, came to be granted by the faculty of arts. (Butts, 1955, p. 160)

Much of the early efforts as related above were done through criteria based upon the completion of an area of study. During the period of the reformation certification requirements of teachers were changed. Examinations were used to determine if prospective teachers had met predetermined standards rather than the completion of an area of study as the sole determinate. This change may have been based on a combined interest of the church and state:

> In general, the Reformation began to emphasize the importance of teaching and of better prepared teachers. Although the improvement was necessarily slow, the combined interest of state and church in religious orthodoxy led to the setting up of standards for the teaching profession and marked the beginnings of certification and

> examination of teachers by the state churches. . . . teachers were required to abide by the state laws and ordinances that laid down prescriptions for curriculum, discipline, and religion. (Butts, 1955, p. 211-212)

Although the points illustrated thus far are of European origin, a foundation had been established for the certification of teachers in colonial America. It can be seen that early American history reveals similarities to Europe in the selection and certification of teachers:

> Teachers of town schools were usually appointed at town meetings or by the selectmen with the approval of ministers. Teachers of church schools were usually appointed by church officials or clergymen. This meant that the qualifications of teachers were passed upon by towns, by churches, by royal companies, by royal governors, and often by the bishop of London in the case of Church of England teachers. It meant, too, that the most important qualification for teaching was religious orthodoxy.
>
> Licenses for teachers were regularly issued by civil authorities in all the colonies—another evidence of civil control of education. (Butts, 1955, p. 254)

The early history of educational certification in this country reflected a broad base concern for the qualifications and background of teachers. This concern was multi-purposed, that is: (1) for the protection of society, and (2) for the protection of the profession. Similar concern and subsequent certification were noted in other professions; laws had been enacted to require license or certification by architects, dentists, electricians, engineers, laywers, nurses, physicians, plumbers, and various technicians.

Authority and control for the certification of teachers has undergone a transition from local, to county, to state levels of government. This transition has been noted in most states. Illustrative of these changes is the following annotated chronology for New York State spanning approximately one hundred years:

1795-1812 Town Commissioners determined the qualifications.
1812-1841 Town Commissioners and three Town Inspectors examined and certificated.
1841-1843 Town Commissioners and two Town Inspectors examined and certificated. County Superintendent had supplementary powers.
1843-1847 Town Superintendent, County Superintendent, and State Superintendent all were authorized to examine and license.
1847-1856 State and Town Superintendents controlled certification jointly.
1856-1888 County School Commissioner (Superintendent) examined and licensed locally under rules prescribed by the State Superintendent. The state also examined and certificated with statewide validity.
1888-1894 State Superintendent and County Commissioners examined and certificated teachers. All questions were uniform and were prepared by the state.
1894- Full state control, county acting only as agent. Supervision of all teacher training classes placed with the state. (Kinney, 1964, p. 46-47)

Shifts from local superintendent of schools or town commissioners to state control of teacher certification may have occurred due to several reasons; overall the most serious contributing factor may have been the possibility of unqualified teachers.

Following the widespread adoption of state level control of certification, changes in the criteria for certification have been noted. One influence for these changes was the Smith-Hughes Act of 1917. This legislation provided for the promotion of vocational education under the control at a Federal Board of Vocational Education. An early pronouncement has been noted on the subject of the preparation of vocational teachers:

> It is, of course, essential always that the teacher shall be able to teach, but it does not follow that he shall always qualify as a professional teacher. It is much more important that the instructor in carpentering, for example, at least as regards shopwork instruction, shall be a competent carpenter than that he shall have attended a normal school. Provided he can teach carpentry to beginners, he fulfills the chief professional requirement for a vocational teacher of carpentering.

> This is the prime requisite and all other qualifications are secondary. He must be of good moral character, and unobjectionable in every respect, but provided always, that he can teach carpentering, he should be judged and certified in other respects as a man, rather than as a professional pedogogue. (Federal Board of Vocational Education, 1918, p. 25)

Reference to competency in an occupational area reflected an intent which has become requisite to teacher certification in vocational education. The requirement of actual occupational employment, for varying lengths of time, is common to all states as part of the requirements for vocational teacher certification.

The Commonwealth of Pennsylvania has, as a part of the regulations of the State Board of Education, a section which reflects not only such a period of occupational employment, but also the successful completion of an examination to establish occupational competency:

> The Secretary of Education may issue a Vocational Intern Certificate for teaching in the public schools of the Commonwealth to an applicant having assurance of employment by a school district who, in addition to all legal requirements,
>
> a. Presents evidence of sufficient employment experiences beyond the learning period to establish competency in the occupation to be taught.
>
> b. Shall have successfully completed the occupational competency examination, or evaluation of credentials for occupations where examinations do not exist.
>
> c. Is enrolled, or accepted for enrollment, by a teacher education institution in an approved program leading to the Vocational Instructional I certificate.
>
> d. Is recommended for the certificate by the institution holding such approval. (State Board of Education of Pennsylvania, 1973, section 49.151)

Educators have reflected an endorsement of the relationship between this examination and teaching. It has been stated that occupational competency and subject matter mastery are essential ingredients in the

composition of a vocational teacher (Schaefer, 1968). Further claims state that the quality of classroom instruction depends directly upon the occupational competency of the teacher (Nelson and Barlow, 1973).

Some discrepancy to the above support for occupational competency has been noted. One researcher concluded that there was no correlation between occupational competency examination scores and years of wage earning experience (McAlister, 1973). A conclusion had been stated that the value of the occupational competency examinations can not be determined (Impellitteri, 1965).

The Problem

The problem of this investigation was—does performance in the occupational competency evaluation constitute a valid indicator of subject competence? The specific questions investigated were:

1. Is there a relationship between written and performance success in the evaluation?

2. Does the degree of success in the evaluation give a valid indicator of non-pedagogical competency?

3. Is there a relationship between the degree of success in the evaluation and evidence of the command of subject matter as a teacher?

Chapter II

REVIEW OF RELATED LITERATURE

The U.S. Office of Education awarded the National Occupational Competency Testing Project at Rutgers University a grant to:

> . . . establish a Consortium of States; develop occupational competency examinations in major industrial occupations; and organize a permanent institution to administer the examinations, develop additional examinations, and carry on further research in occupational competency testing. (A. Panitz, 1974)

A result of this grant was the establishment of the National Occupational Competency Testing Institute (NOCTI). The Educational Testing Service (ETS) is now affiliated with NOCTI and acts accordingly with the procedures set forth by the Consortium of States and is responsible for the continuation of competency testing in the member states. In the spring of 1974, the first NOCTI test was administered. Two specific conclusions from this test resulted: First, the states are concerned in developing reliable, valid occupational competency tests; secondly, NOCTI has the potential to eliminate duplication of tests and efforts of individual states.

Occupational competency evaluation tests are being used to "certify" vocational educators through the National Institute. A study of Schaefer (1968) showed that occupational competency and subject matter mastery were both necessary to vocational educators. Supporting Schaefer's study, Nelson, et al. (1973) found that a direct relationship existed between teaching ability and the occupational competency of vocational educators.

In opposition to the Nelson et al. study, a lengthly study was undertaken by the Department of Research of the Federal Reserve Bank of Philadelphia to, "examine the relationship between use of school resources and achievement growth of students," (Federal Reserve Bank of Philadelphia, February 1975).

The report emphasized an interesting phenomena:

> Whether teachers have more or less education beyond the B.A. or fare better or worse on the National Teacher Examination (Common) does not seem to make them more effective educators. Neither of these factors appears to result in increased productivity. The absence of impact on achievement of extra training is consistent with many education studies and with the large-scale studies by social scientists—yet teachers who take extra educational work beyond the B.A. are rewarded with salary increases, unlike principals. Increased use of in-service training in Philadelphia may reflect an awareness of the need for different training. The discriminatory powers of the National Teacher Examination were evaluated by the School District in 1972. The School District concluded that the examination should not be the only measure of a teacher's potentiality; our findings suggest that it should not be used as any measure. (Federal Reserve Bank of Philadelphia, February 1975)

In this study, this problem will be approached from the supervisor ratings of the vocation instructor and then correlated with the occupational competency evaluation scores.

In addition, the results of Nelson's study pointed to the need of a valid instrument which could be used to evaluate teachers, i.e. occupational competency evaluation tests. This study seemed to imply that a monitoring system was needed, ultimately responsible to state officials, in order to prevent the test from becoming obsolete. Developing new tests and up grading the old ones presented a problem for many state officials. These state officials are responsible for keeping pace with any technological advances in both teaching techniques and occupational information.

Glaser and Klaus (1962) showed that:

> . . . a proficiency test can be considered valid if it discriminates among individuals presumed to range from no proficiency to high proficiency in a given skill. The validity of a proficiency test, then, is established by demonstrating that the test scores reflect the differences in skill levels of the performance being assessed.

The scale of the instrument used in this study was a five point Likert scale. The data used for comparison with the occupational competency evaluation was obtained from questionnaires completed by supervisors of teachers. These educators were supervisors of teachers who completed the evaluation between 1968-72. Glaser and Klaus (1962) stated that:

> The proficiency test used at the completion of a training course . . . may establish the degree to which an individual has acquired knowledge about his job or has mastered the necessary skills. It does not demonstrate that the individual will perform effectively in the job situation.

The intervening time of three years or more was designed into the study to permit years of teaching experience for each of the graduates. This allowed the supervisors of the graduates sufficient time to monitor them in actual teaching conditions.

A study by M. E. Larson and W. Crain examined the usages of occupational competency evaluation tests throughout the United States. Questionnaires were sent out to the state directors of vocational education in the fifty states and the four territories and to the individuals in charge of examinations in the specific states, who administered the tests. The results showed that 16 states administer some form of occupational competency evaluation tests: 12 in technical trades, two in business trades, one in office trades and one in distributive education. Of these 16 states, five are planning to discontinue the

tests, while seven more are planning to start to use them. Occupational competency evaluation tests are being used in 12 states to allow college credit, eight states are using the tests for credentializing. However, only two respondents used the examination scores plus years of experience to equate eligibility for certification purposes.

Using occupational competency evaluation examinations for constructive feedback can be very feasible. W. F. Oliver (1967) developed a study to determine if there existed any relationship between informational feedback of vocational instructors and their supervisors and students. Normally it would be expected that any feedback, regardless of its origin, would cause positive effects. This was not the case. Supervisor feedback failed to bring about any change in the vocational instructor. However, student feedback did improve the instructors effectiveness in his teaching role in the classroom. Curiously, a combination of both student and supervisor feedback did not exceed the effectiveness level of just the student feedback. This shows that supervisor feedback is not as valuable as the student feedback, even when used in conjunction with the student feedback. A final statement in Oliver's study showed that after ten years of teaching, the vocational instructor did not respond to either sets of feedback.

Chapter III

PROCEDURES

Introduction

The purpose of this study was to measure the relationship between occupational competency evaluation scores and supervisor ratings of subject competence. This chapter describes procedures used in the development of an instrument, selection of the population and sample, collection of data and analysis of data.

Development of an Instrument

The instrument developed for this study was specifically designed to measure the subject matter competency of teachers through ratings by their supervisors. In the construction of the 17 item questionnaire the following steps were taken:

1. A review of the literature revealed that a majority of the instruments designed to perform a similar function were constructed using: 1) a series or group of items to be rated, and 2) each item was rated using a Likert-type scale.

2. Categories were identified by the investigators to reflect areas which would exhibit degrees of subject matter competency maintained by teachers. These categories were then used as a guide to develop clusters of statements which could be rated by supervisors.

3. The pilot questionnaire of 18 items and a letter of explanation were delivered to a panel of 14 judges including faculty, administrators, and graduate students at The Pennsylvania State University and selected supervisors in public schools. These judges were instructed to rate each

item on a five point Likert scale with a low of one and a high of five. The pilot questionnaire and the letter of explanation are located in Appendix A.

4. Analysis of the judges' ratings and subsequent modification of the questionnaire was accomplished.

The analysis of the 14 judges' ratings revealed an interjudge reliability of a .77; this figure, however, included one judge who was consistently low on all of his ratings. By eliminating this judge, the new interjudge reliability was then increased to .89. Using 13 judges with a forced dichotomous classification on the Likert scale revealed an 88 percent level of agreement (i.e., in agreement at points four or five on the scale). Using the same procedure in a more liberal sense (i.e., in agreement at points three, four or five on the scale) revealed a 96 percent level of agreement. It was felt that, with such high levels of agreement on the pilot questionnaire, that the validity of the revised questionnaire had been confirmed. Seventeen of the original 18 items were judged as valid and were retained on the revised questionnaire. A copy of the revised questionnaire used in this study is located in Appendix B.

Population and Sample

The sample for this study consisted of persons who have successfully completed the occupational competency evaluation for vocational teacher certification and who were employed as a full-time secondary teacher in Pennsylvania at the time of this investigation. A five year time period (1968 to 1972) for completion of the evaluation was established for the sample. This provided a sufficient teaching time period to insure knowledgeable supervisor ratings.

The total population was identified through an inspection of the occupational competency evaluation records maintained by the Department of Vocational Education at The Pennsylvania State University. The initial step of identifying the occupational status and location of the candidates was determined through an inquiry of faculty and students of vocational teacher education classes at The Pennsylvania State University. Additional identification was achieved through telephone contact of candidates by members of the investigation team. Telephone numbers were secured through inspection of applications for the occupational competency examination and departmental information cards filed at the Department of Vocational Education.

The original list of 197 persons successfully completing the occupational competency evaluation during the selected time period included the 107 qualified candidates included in the actual sample. Elimination of candidates occurred due to the following categorical reasons: persons not teaching, 53; persons teaching part-time, six; persons teaching nonvocational subjects, three; persons teaching in institutions other than at the secondary level, 11; persons who could not be located, 15; and other, two.

Persons responsible for the supervision of the remaining candidates in the sample were identified in the Pennsylvania Vocational Education Personnel Directory 1973-74.

The sample in this study consisted of 107 full-time vocational teachers in Pennsylvania secondary schools who successfully completed the occupational competency evaluation between 1968 and 1972 at The Pennsylvania State University. Although administration of this evaluation was conducted by the Department of Vocational Education at The

Pennsylvania State University, characteristics of this sample would be similar to all other beginning vocational teachers in Pennsylvania who were certificated by Temple University and the University of Pittsburgh. Similarities in competency evaluations may not necessarily exist between the occupational competency evaluations used in this study and others outside the Commonwealth of Pennsylvania.

Collection of Data

The data in this study was collected from two sources: (1) occupational competency evaluation scores, and (2) supervisor ratings. Each occupational competency evaluation score consisted of two parts; (a) a score for the written section, and (b) a score for the performance section.

As maintained in the files of the Department of Vocational Education of The Pennsylvania State University the occupational competency evaluation scores were in raw form. To permit statistical comparison, these raw scores were converted to standard T scores using an IBM 360-165 computer. The program used in this operation was obtained from the Statistical Package Program File (STPAC) located at The Pennsylvania State University Computation Center. The title of the program used was Mini-Tab.

Seventeen occupational competency categories were identified in this investigation. A complete frequency analysis of these categories is below.

It should be noted that two otherwise qualified candidates in the sample were eliminated since these candidates had no other members in their respective occupational areas; the standard scores were unable to be computed.

> A related point is that standard scores cannot be computed in some cases. Since the use of Z scores [another form of a standard score of which the T score is based] *depends on* the mean and standard deviation as indices of central tendency and variability Z scores cannot be computed if the mean and the standard deviation cannot be computed. (Games and Klare, 1967, p. 164)

Table 1

Occupational Competency Areas

Occupational Area Examined	Frequency
Appliance Repair	1
Auto Body Repair	13
Auto Mechanics	15
Building Maintenance	8
Carpentry	16
Commercial Art	1
Computer Technology	8
Drafting	20
Electrical, General	8
Electronics	19
Machine Shop	39
Masonry and Bricklaying	5
Millwork and Cabinetmaking	8
Plumbing	6
Printing	11
Quantity Foods	9
Welding	10

The supervisor ratings of the subject matter competency of members in the sample were obtained by the use of a questionnaire specially designed for use in this study. The questionnaire, a letter of explanation, and a stamped self-addressed return envelope were mailed to

selected supervisors on October 14, 1974. The questionnaire and letter of explanation can be seen in Appendix B. Due to the high percentage of returns (i.e., 72 percent were received within one month of the first mailing), the use of a follow-up letter was abandoned. As an alternative to the follow-up letter, individual telephone calls were placed to supervisors who had not returned the questionnaire. By December 20, 1974, 86 percent of the questionnaires were received.

Analysis

The statistical methodology used in this study included computation of a Pearson Product Moment Correlation (PPMCR). The statistical analysis was done using an IBM 360-165 computer. The program used in this operation, entitled PPMCR (revised May 9, 1972), was obtained from the Statistical Package Program File (STPAC) located at The Pennsylvania State University Computation Center. The PPMCR was used to test the degree of relationship in four areas:

1. The degree of relationship between the combined T scores, (written and performance sections) of the occupational competency evaluations and the supervisor ratings of those same teachers.

2. The degree of relationship between the T scores of the performance section of the occupational competency evaluation and the supervisor ratings of those same teachers.

3. The degree of relationship between the T scores of the written section of the occupational competency evaluation and the supervisor ratings of those same teachers.

4. The degree of relationship between the T score of the written and the performance sections of the occupational competency evaluation.

Chapter IV

FINDINGS

Combined Subject Areas

A coefficient in the low positive range was attained when the written and performance portions of the occupational competency evaluation (OCE) were correlated. These results were expected because they require different personal attributes and skills.

The correlation ratio of the combination of the written and performance portions of the OCE when compared with just the written and just the performance test appeared to be approximately equal. This shows that both portions of the test can be compared equally without trying to statistically manuver the raw correlation coefficients into another scale (i.e., "T" test or "t" scores). Figure 1 shows the correlation of both performance and written portions of the OCE.

A middle ranged positive correlation value was recorded with the written part of the OCE when the supervisor rated the instructor's competency in his own field. This might have resulted from the supervisor only being able to observe the instructor in a classroom demonstration which did not reflect the limits in his performance capabilities. This rationale was verified by a very low positive correlation with the performance portion of the OCE.

In the opinion of the supervisors the instructors did not keep up with new innovations in their field. Low positive correlation scores on both the written and performance portions of the OCE illustrate this premise.

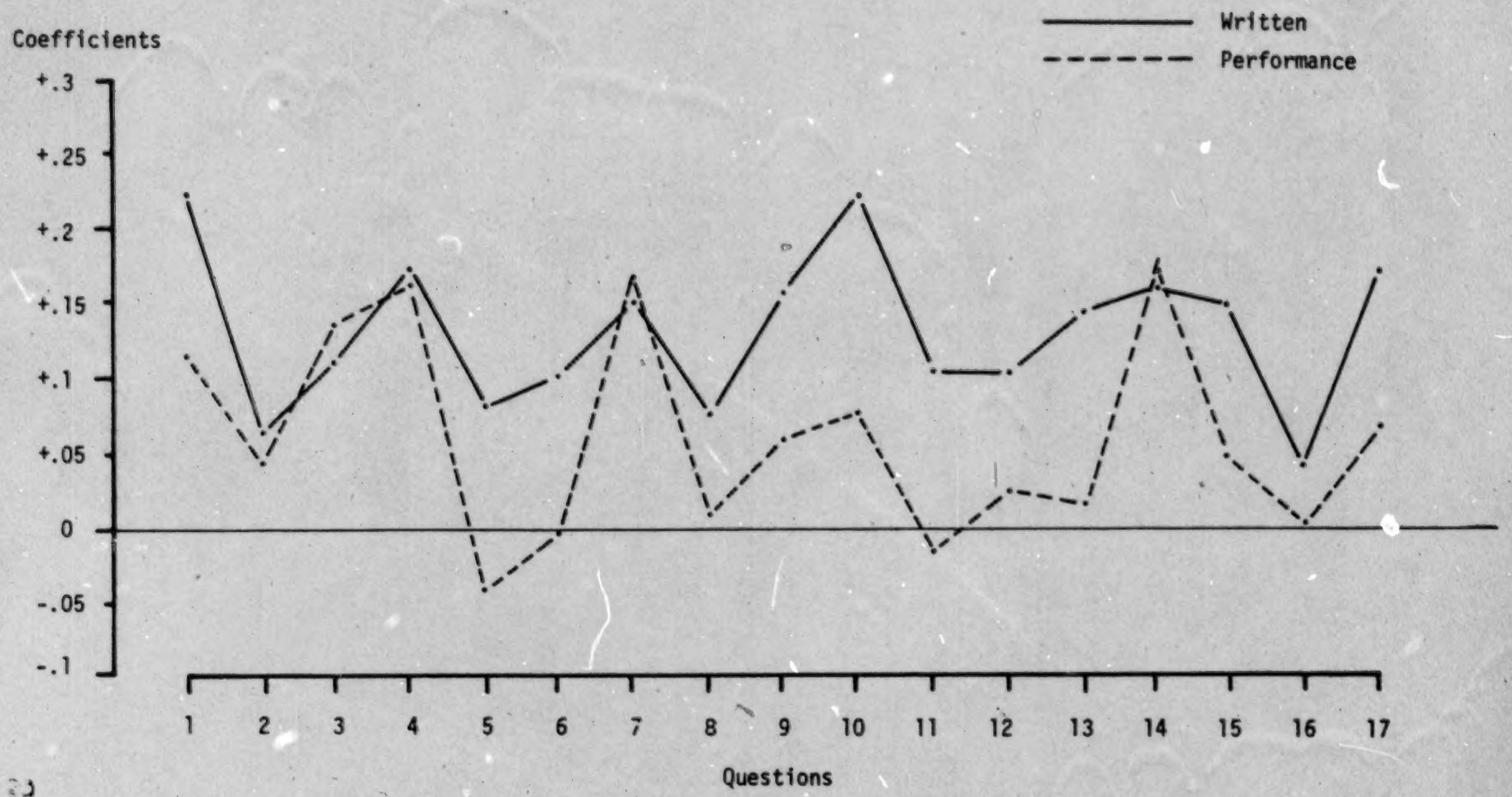

Figure 1

CORRELATION COEFFICIENTS OF WRITTEN AND PERFORMANCE SECTIONS WITH SUPERVISORS RESPONSES

The instructor's knowledge and abilities pertaining to his field with references to student counseling and their perception of him showed very low correlation with either the written and performance portions of the OCE. Of course it must be pointed out that these results were determined by supervisor observations recorded in a 1-5 point rating fashion.

Supervisor ratings for the instructor's ability to produce students that are able to meet the standards of the respective fields were in the low positive correlation range when related only to the written portion of the OCE. When this same area of concern was compared to the performance portion, the correlation dropped to a lower positive score. These results revealed this important pedagogical task was related stronger to the written portion of the OCE than the performance portion.

The supervisor ratings showed a very low correlation between the OCE and the ability of the test to identify the teachers ability to perform as a qualified tradesman in his field. In addition, a very low correlation resulted when the supervisor rated the instructor's ability to portray a real work setting to his students. In the opinion of the supervisors, the OCE does not identify potential talent.

Teaching, as the supervisor ratings have shown, does not add to the competency of the instructor in his field. A low positive correlation between the written and performance portions of the occupational competency evaluation occurred when this question was asked.

The performance portion of the OCE revealed a very low positive coefficient when correlated with the opinion of the supervisor as to the instructor's fellow tradesmen recognition of him as being competent in his field. A slightly higher correlation coefficient occurred with the written portion.

Carpentry

The carpentry instructors were isolated from the major portion of the study for the purpose of analyzing their unique qualities. From the entire sample population, these instructors comprise a total of nine. The Pearson Product Moment Correlation (PPMCR) was used to measure the correlation between written/performance portions of the occupational competency evaluation and the ratings from the instructors' supervisors.

The correlation between the written and performance portions of the occupational competency evaluation resulted in a very low correlation. Figure 2 illustrates these low correlations in both the written and performance portions of the OCE. It will be evident throughout this chapter that this occurred frequently.

A good example of this was reflected by the high positive and low negative values generated in the question pertaining to the competency rating of the instructor as seen by other teachers of his field. The supervisor rating was high positive for the performance portion of the OCE. The rationale for this may be that the teachers feel that the performance test accurately reflects the real work setting, and if it is poised under stressed test conditions, the same activity can be accomplished anywhere else. This was a very strong point because it was the only positive correlation in the carpentry data. Again, relating to the instructor's competency as perceived by other teachers, the written portion of the OCE had a high negative correlation. This meant that, in the opinion of the supervisors, his fellow teachers do not feel that a high score on the written tests will relate to a high proficiency in the instructors' field.

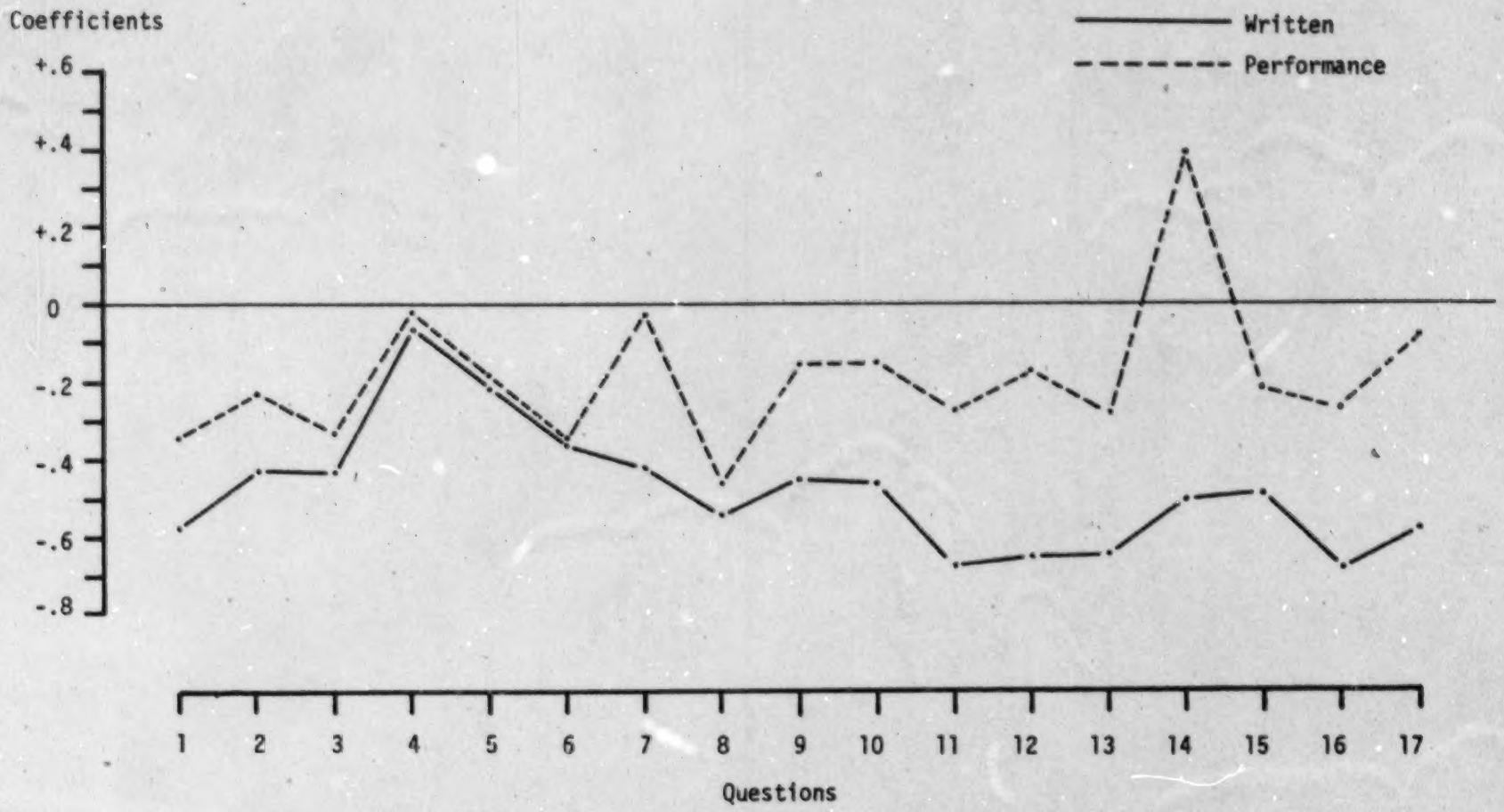

Figure 2

CORRELATION COEFFICIENTS FOR CARPENTRY TEACHERS WRITTEN AND PERFORMANCE SECTIONS WITH SUPERVISORS RATINGS

From the students point of view, as rated by the supervisor, the instructor's knowledgeability in his field did not relate to the instructor's score on the written and performance portions of the OCE. The students could be easily swayed by the personality attributes, (i.e., student polls could be invalid and course recommendations could be swayed by his grades).

One of the important roles that a teacher performs is his accuracy in portraying the real work setting for the students. When rated by the supervisor a high negative correlation resulted with both the written and performance portions of the OCE. This points out the fact that, like the students, the supervisor can be swayed by either personality or exciting demonstration effects. Because a negative correlation exists, the instructor's inability could be detrimental to the students' education.

Data concerning the instructor's prior work experience was correlated with the adequacy as a teacher. A high negative value was attained with the written portion of the OCE. As previously stated in this chapter, a high negative correlation can be expected when written and performance tasks are contrasted with each other.

The opinion of tradesmen from the instructor's field, as rated by the supervisor, cannot be used as a reliable indicator in identifying the instructors as being competent. This was indicated by the high negative correlation value with the written portion of the OCE. In addition there was a low correlation between his performance score on the OCE and his fellow tradesmen opinion of his competency. Those results contradicted the results of the rating related to his fellow teachers' opinion.

A high negative correlation between the written score from the OCE was attained, while a low negative correlation occurred from the performance portion of OCE. This occurred when the supervisors were asked to rate the instructor's attempt to keep up with new innovations in his field. This possibly implied that the educational process halts after certification.

In the opinion of the supervisor, the OCE written and performance test scores of a particular carpentry instructor was independent from the level of success that his students attain after graduation. This was indicated by the negative correlating value in both the written and performance portions of the OCE.

Additionally, a negative correlation value in both the written and performance OCE tests occurred when it was correlated with instructor's students' performance on the job after their graduation. This is an affective educational objective and cannot be directly correlated to the effective educational goals.

Drafting

The drafting instructors were isolated from the major portion of the study and analyzed using the identical method that was used for carpentry, electronics and machine shop studies.

When the written and performance portions of the occupational competency evaluation were correlated using only the drafting population a very low positive correlation value was attained. This was one of the lowest scores recorded in this sample. Figure 3 shows the correlation values of both the written and performance portions of the OCE and the interaction with the various questions.

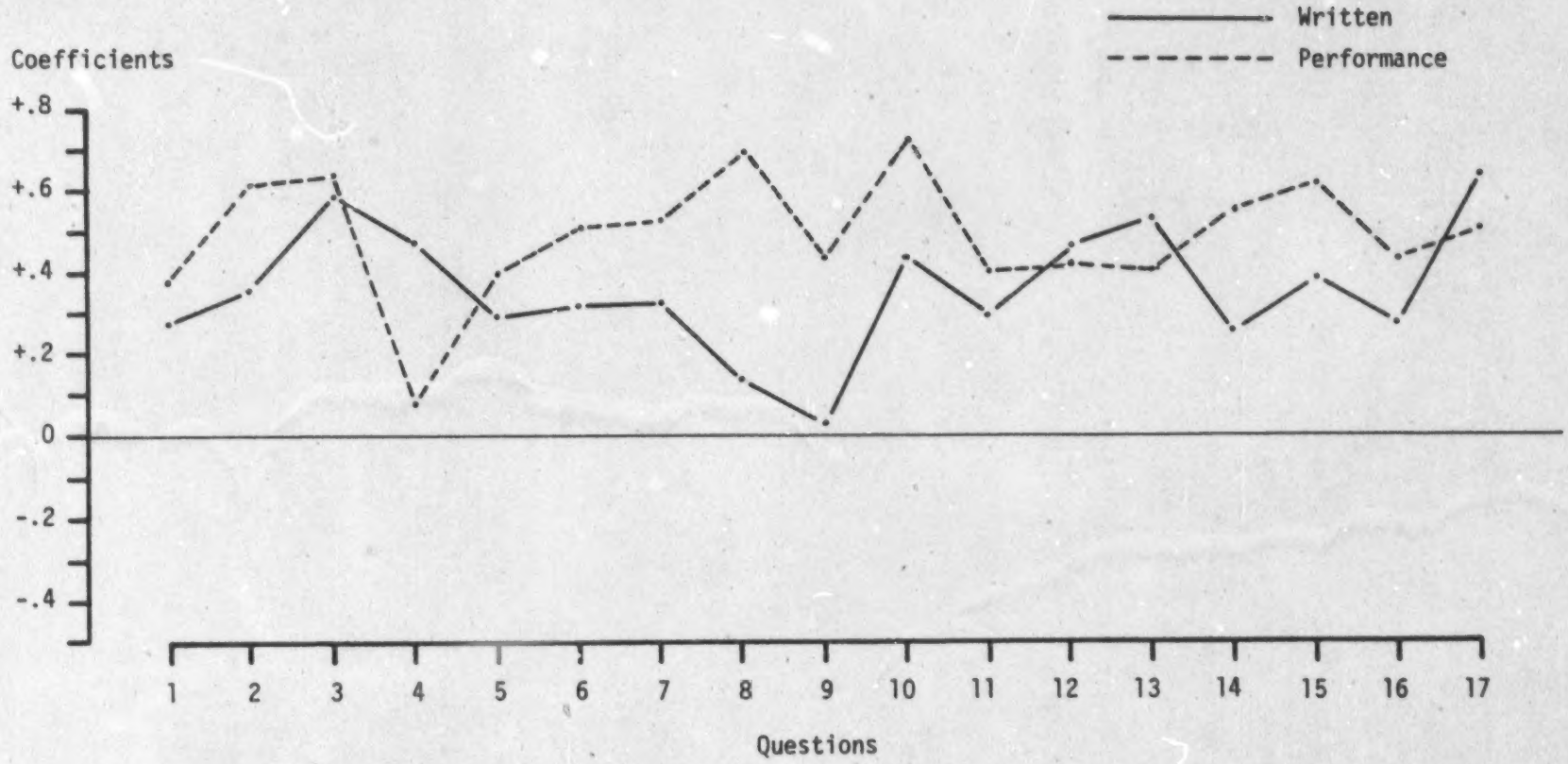

Figure 3

COEFFICIENTS FOR DRAFTING TEACHERS WRITTEN AND PERFORMANCE SCORES WITH SUPERVISORS RATINGS

The supervisors gave a high positive score which resulted in a high correlation value with the performance portion of the OCE when asked if the drafting instructors were competent in their respective fields. A lower positive score was found on the written portion. Much like the results in carpentry, the drafting supervisors noted a greater emphasis on performance when the competency of the instructors was questioned.

In the opinion of the supervisor, other teachers, when asked to rate the competency of an instructor in their field, scored them low, resulting in a low positive correlation in the written portion of the OCE. The performance correlation was in the high positive range, however it was substantially lower than the correlation value with the performance test when rated solely by the supervisor.

A high correlation value was attained for the performance portion of the occupational competency evaluation when the supervisor rated the instructor's accuracy in portraying a real work setting in drafting. The written portion of the OCE correlation value was not significant. These results point out how necessary it is for the instructor to be able to do what he teaches.

There was a high positive correlation with the written portion of the OCE when the instructor was rated by his supervisor for being correctly identified by the occupational competency evaluation as being competent. The performance score was in the low positive range which indicates that although performance learning is necessary, re-learning the performance tasks might happen on the real job. This brings to question the validity of the school learned performance techniques and

questions whether these techniques reflect the most recent innovations in use on the job. In academia, the emphasis is on the written not performance.

Results like what were stated in paragraph above, lead the tradesmen to rely more heavily on the written OCE score. In the opinion of supervisors, these tradesmen have shown no belief that the performance tasks learned in school correlate with ability to do his work on the job.

As compared to other teachers in drafting, the competency of the individual instructor could be predicted when correlated to the performance portion of the OCE. The written portion was not significant in rating his comparative competency.

The instructor's adequacy in answering all the students' questions about his relative field was highly correlated with his performance OCE score. In the supervisor's opinion the written portion of the OCE was not significant in predetermining the answer to this question.

The supervisors' observations have indicated that the graduates' performance on the job correlated highly with the instructors' written and performance scores on the OCE. These results are ambiguous and could be the results of many affective job conditions.

Electronics

The teachers of electronics who conformed to the prerequisites of the overall sample were isolated to make a subsample for additional analysis. The N of the electronics group was nine.

The correlation between the scores of the written and performance sections of the occupational competency evaluation was computed to be

less than .300. This value was below the minimum established to be considered of significant value in the study. The comparison of the written score of the comprehensive evaluation and of the opinions expressed by supervisors, through the instrument used, shows a positive correlation of varying magnitude. The higher correlation coefficients from the 17 different opinions expressed are shown in Table 2. Forty-one percent of the 17 opinions expressed showed a positive correlation of .418 or higher. The upper limit of the coefficients in this group of questions was a .725. The remaining 59 percent of the correlations ranged from a low of .173 to the correlation of .418 illustrated in Table 2.

The resultant comparison of the performance score of competency evaluation and the opinions expressed by the supervisors computed by Pearson Product Moment Correlation resulted in coefficients that were markedly different from those obtained in the written part. Figure 4 illustrates the interaction of the correlation values for both portions of the OCE. Ten of the coefficients computed for the relationship between the 17 opinions expressed by the supervisor and the performance score of the competency evaluation were negative coefficients. The overall number of low coefficients was much more prevalent than had been found in the written portion of the competency evaluation. As is illustrated in Table 3 there were coefficients showing zero correlation. Less than 30 percent of the coefficients indicated any important correlation and all of these were a negative coefficient. Thus the overall pattern, as illustrated by the 41 percent of the calculated coefficients in Table 3, resulted in coefficients below the predetermined level of importance.

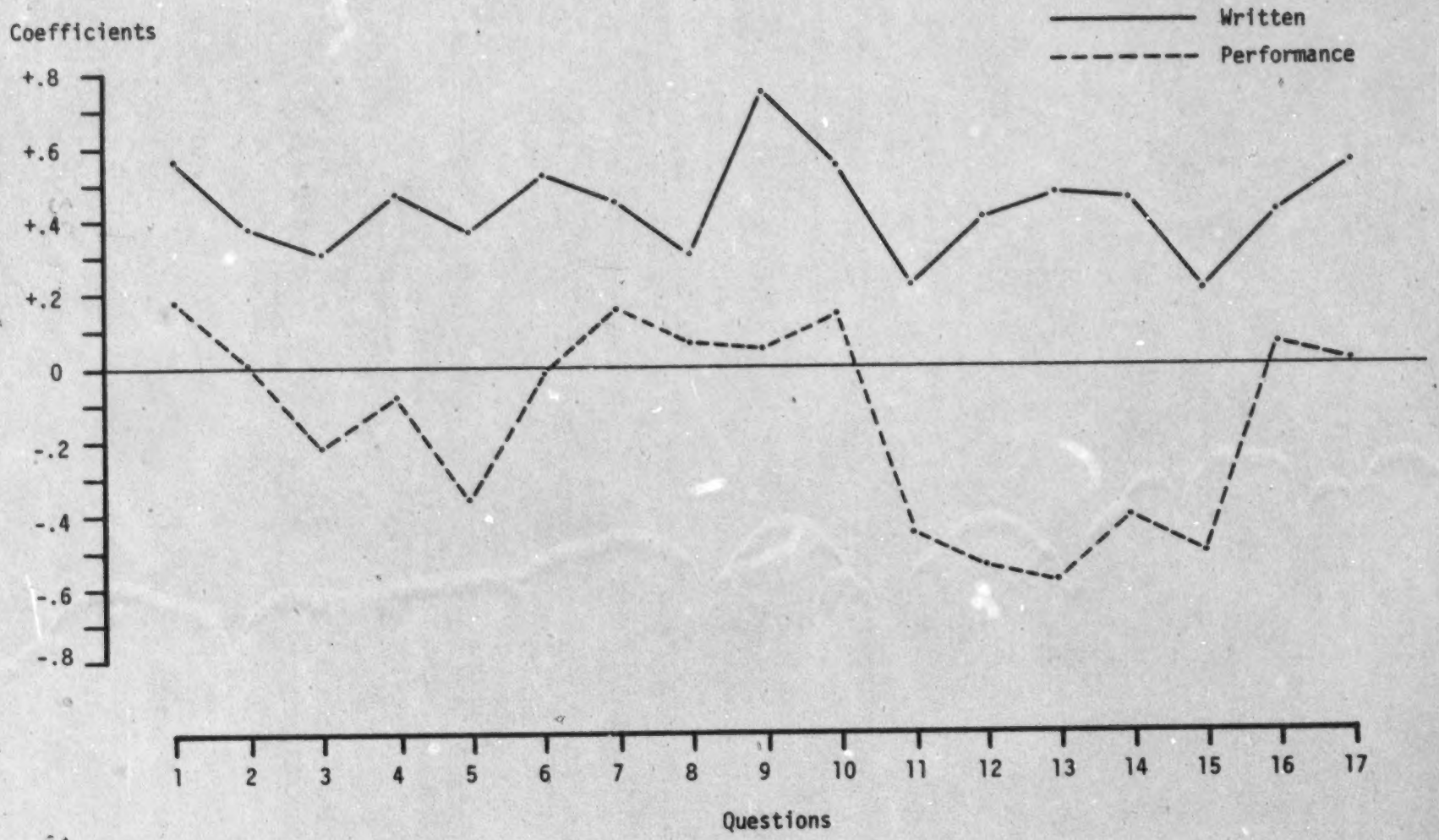

Figure 4

COEFFICIENTS FOR ELECTRONICS TEACHERS WRITTEN AND PERFORMANCE SCORES WITH SUPERVISORS OPINIONS

Table 2

Coefficients of Written Section of Electronics Evaluation

Question Number	Correlation Coefficient
1	.576
4	.472
6	.511
9	.725
10	.522
14	.418
17	.511

Table 3

Coefficients of Performance Section of Electronics Evaluation

Question Number	Correlation Coefficient
2	.000
3	-.222
4	-.092
6	-.029
10	.127
14	-.437
17	-.029

The separate analysis of the instrument opinions by comparison with the written and the performance competency evaluation scores reflected the correlation between these two sections. The low value of this correlation coefficient was exemplified in the individual analyses.

Machine Shop

There were a total of 11 teachers of machine shop practice included in the sample. So that further study of the data collected could be made, this subgroup was also subjected to additional analysis.

The correlation coefficient between the written and performance scores of the competency evaluation was again well below the minimum level of importance. The exact opposite was found for machine shop instructors, when relating the opinions of the supervisors to the two parts of the occupational competency evaluation, as had been evident for the teachers of electronics. This subgroup analysis resulted in many negative correlation coefficients when comparing the written portion scores of the competency evaluation with the opinions expressed by supervisors. Correlation values are illustrated in Figure 5. Eighty-eight percent of the correlation coefficients in this group were negative. The extremes of these coefficients are shown in Table 4. The lower coefficient which was positive and the higher coefficient which was negative are both contained in the data presented in Table 4.

The comparison of the score of the performance portion of the competency evaluation and the opinions expressed by supervisors resulted in correlation coefficients which differed greatly from those found with the written scores of the evaluation. Thirty percent of the correlation coefficients were found to be negative. The range of the negative correlations was from a -.029 to a high of -.341. The majority of the correlations found in this comparison were positive. Thirty percent of these correlations were above a coefficient of .359. The extremes of the correlations found in this comparison are shown in Table 5. The

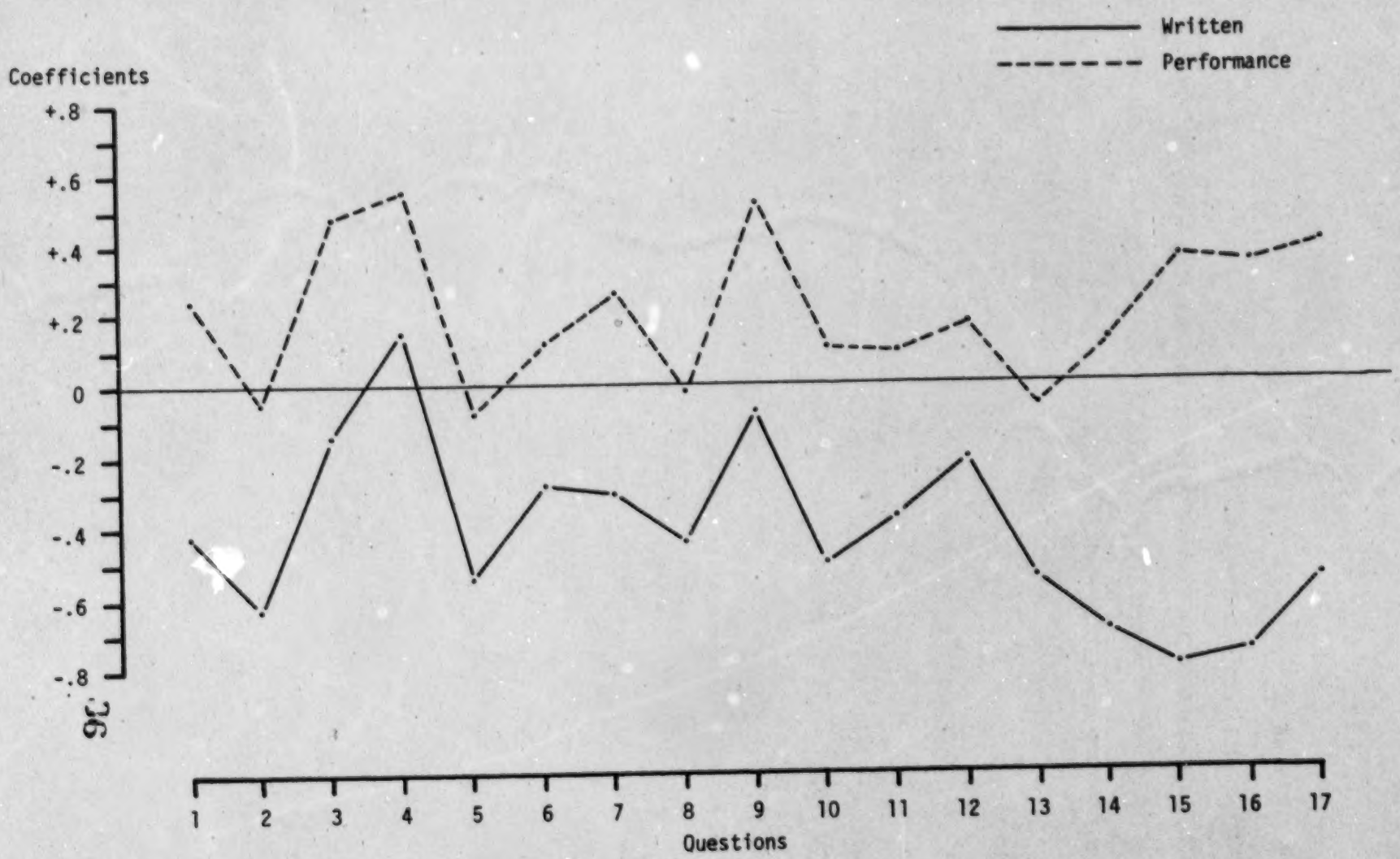

Figure 5

COEFFICIENTS FOR MACHINE SHOP TEACHERS WRITTEN AND PERFORMANCE SCORES WITH SUPERVISORS RATINGS

correlations computed for ten of the 17 opinions expressed by the supervisors were below the minimum level established for significant coefficients and thus no relationship was evidenced.

Table 4

Coefficients of Written Section of Machinist Evaluation

Question Number	Correlation Coefficient
2	-.636
4	.158
7	-.301
9	.084
13	-.553
15	-.801
16	-.771

Table 5

Coefficients of Performance Section of Machinist Evaluation

Question Number	Correlation Coefficient
4	.555
9	.502
10	.095
13	-.071
15	.359
16	-.341
17	.399

The low correlation between the scores on the written and performance portion of the competency evaluation for machine shop instructors predicted that variation between these scores would be evident. The analysis, on the bases of these two variables, with the opinions expressed by supervisors illustrated the absence of any significant relationship between the performance score on the competency evaluation and the opinion of supervisors as to the capability of the teacher in non-pedagogical factors.

Summary

It is noteworthy to recognize the differences that are evident between teachers of different subject areas. The almost complete reversal of the data for machine shop and electronics instructors is somewhat surprising. The machine shop instructors showed performance correlation coefficients of high positive value when related to the opinions of the supervisors. The electronics instructors showed these higher coefficients for the scores of the written portion of the competency evaluation. The exact opposite was true in connection with the machine shop and electronics instructors when relating their scores on the competency evaluation to the opinions of supervisors. Thus the machine shop instructors' correlation coefficients were predominately negative when comparing their written scores with the opinions of the supervisors. It was the electronics instructors' performance section of the evaluation that correlated mostly negative with the opinions of supervisors.

A comparable tendency of opposite correlations existed between drafting teachers and teachers of carpentry. The drafting instructors scores of both the written and performance evaluation revealed positive

correlation coefficients with the opinions of the supervisors. The coefficients for the performance scores were generally higher than for the written scores.

The carpentry instructors' scores on both performance and written evaluation resulted in negative coefficients when computed with the supervisors' opinions. The correlations with the performance scores were higher. The one positive coefficient was in the performance scores. The correlation of opinions and written scores were all negative coefficients but these coefficients were higher than for the performance scores.

Neither of the four subject area patterns of coefficients were identical to the overall sample. Again a distinct pattern of difference was more evident. Instructors of machine shop and carpentry showed total negative coefficients for the performance scores except for one coefficient. All of the coefficients for the overall sample were positive. Instructors of electronics were most like those of the total N but were higher.

There were three specific questions investigated. Question one was: Is there a relationship between written and performance success in the evaluation?

The computed correlation coefficient was less than .200 for the total sample. A coefficient this low, for the two phenomenon compared, can only be interpreted as verification that no relationship exists. The analysis of the four separate subject areas revealed the electronics correlation as being slightly higher (.282). The other three were all lower. Therefore no evidence of relationship can be verified.

Question two was: Does the degree of success in the evaluation give a valid indicator of non-pedagogical competency?

This question was an attempt to explore the relationship between a high score in the evaluation and a high level of non-pedagogical competency as rated by the supervisor. The coefficients, for this relationship, for the total sample ranged from a high of .229 to a low of .005. Thus these low coefficients can only verify that no relationship exists. Higher coefficients were found when the four subject areas were analyzed separately. However these correlations were computed for the written and performance sections separately. The distinct variation between written and performance sections was noted earlier. Thus when the degree of success in the total evaluation is correlated with non-pedagogical competency, again it can support only a no answer to the question.

Question three was: Is there a relationship between the degree of success in the evaluation and evidence of command of subject matter as a teacher?

An analysis of the relationship between the competency evaluation scores and the supervisor rating on select questions in the opinionnaire was made. The resultant coefficients were of such small magnitude that the only interpretation possible was that no relationship existed between these phenomenon.

However it must be recognized that the supervisor would be more capable of rating pedagogical competency in all classroom and laboratory environments. His ability to observe and rate non-pedagogical competencies would be more limited by his occupational experiences.

Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study was an investigation of the relationships between occupational competency evaluation scores and supervisor rating of non-pedagogical competence in the subject area.

The specific questions explored were:

1. Is there a relationship between written and performance success in the evaluation?
2. Does the degree of success in the evaluation give a valid indicator of non-pedagogical competency?
3. Is there a relationship between the degree of success in the evaluation and the evidence of command of subject matter as a teacher?

The sample groups in this study consisted of 107 vocational teachers in the public schools of the Commonwealth of Pennsylvania who had successfully completed the occupational competency evaluation between 1968 and 1972. This sample included teachers in 17 different subject areas. The second group was the supervisors of these teachers now employed in the public schools of the Commonwealth of Pennsylvania.

The scores on both the written and performance section of the occupational competency evaluation were obtained from the files maintained in the Department of Vocational Education. The instrument used to obtain the supervisor rating was specifically developed for this study. A review of the literature, consultation with supervisors, and consultations with teachers were used to identify questions appropriate to

non-pedagogical competency of teachers. A pilot questionnaire was submitted to a panel of judges including teachers and supervisors for the purpose of validation. The rating of these judges resulted in changes to the questionnaire that was used as the instrument in the study.

Analysis of the data involved several different statistical methods. The raw scores from the written and performance section of the occupational competency evaluation were converted to T scores. The computer program used was obtained from Statistical Package Program File (STPAC) located at The Pennsylvania State University Computation Center. The supervisor ratings on the Likert type opinionnaire scale were assigned numerical values to facilitate the statistical analysis.

The Pearson Product Moment Correlation (PPMCR) was computed for each of the two scores on the occupational competency evaluation and the score obtained from the supervisor's opinion of the non-pedagogical competency of the teacher. This computation was also accomplished by use of the IBM 360/165 Computer utilizing the library program PPMCR revised May 9, 1972.

The computed correlation coefficients showed a low value of relationship between the scores in the occupational competency evaluation and the opinions of the supervisors as to the competency of the teachers. The coefficients between the written portion of the evaluation and the supervisor ratings were moderately higher than the correlations between the performance portion of the evaluation and the supervisors' opinions.

Four of the subject areas containing the larger numbers of teachers were subjected to individual analysis. The purpose of this individual analysis was to identify any trends that may be peculiar to

subject areas and to determine if the grouping of teachers in various subject areas had any effect on the low correlations obtained for the total sample. The analysis of these four subject areas revealed contradictory results. The subject area of electronics more closely paralleled the coefficients for the total sample than any of the other three. However this result was true only of the written portion of the occupational competency evaluation in electronics.

Conclusions

The response ratio of better than 80 percent for the supervisor's group was considered to be a very high percentage of response for this type of study. This is evidence of excellent professional interest and inferred a desire to contribute to the continuing research of education in Pennsylvania.

The revelation that there was little or no relationship between the written and performance scores in the occupational competency evaluation is both commendable and deplorable. It has been recognized for years that occupations consist of both performing skills and the application of knowledge. Recently the importance of the knowledge segment of an occupation seems to be more universally recognized. However it was thought that the applications of skills might also require the utilization of knowledge and thus the occupational competency evaluation scores would reveal a combination of both. The establishment of the fact that the two portions of the evaluation each measure a separate and identifiable identity was considered a strong point of the evaluation. This reaffirmed the need for both sections of those evaluations and verified that the total occupational evaluation must consist of both a written and performance section.

It had been noted in the Review of Related Literature that there appears to be little relationship between those traits measured by the occupational competency evaluation and numerous other teacher characteristics. This study affirmed that opinion, it revealed that the degree of success in either the written or performance section of the competency evaluation had no relationship to the non-pedagogical rating by supervisors. This inferred that the occupational competency evaluation may be a desirable screening devise for teacher candidates but that it had no value so far as it related to the later teaching activities performed by the instructor.

The current interest in educational circles on performance based teacher education has evidently been devoted mostly to the pedagogical performances of teachers. An extensive research of literature and publishers of measurement devices revealed nothing available to rate the non-pedagogical subject matter competency of teachers. When this competency was based on the completion of certain college courses it was assumed that successful completion led to mastery of the subject area. However, with the current thinking on performance or competency being the bases for this determination, more instruments of this type must be developed.

The analysis of the data by the four subject areas of machine shop, drafting, carpentry and electronics reaffirmed the details of little or no correlation. These details were not as extremely evident in the analysis of data of the total sample. These four areas reaffirmed the distinctiveness of both the written and performance section of the occupational competency evaluation. However, the great variation between the four subject areas did little or nothing to clarify the

purposes of this study. The relatively limited numbers of skills in electronics and drafting as compared to carpentry and machine shop fostered the opinion that similarities would be more evident in the subject areas of drafting and electronics. This served to reaffirm a distinctive identity and individuality of each occupational area. It is evident that development of or modification of occupational competency evaluations should depend upon knowledgeable individuals in each occupational area. The absence of any noticeable trends in correlation with the total sample would serve to reaffirm this conclusion. If the correlations between the written and performance sections had been more noteworthy and the correlation between the competency evaluation and the supervisors of lower value, it could possibly be assumed that this study asked the supervisors to perform an impossible evaluation. However, there was no evidence to support any opinion that supervisors do not recognize non-pedagogical competency. There was nothing found in this study that would infer that the supervisor was not capable of rating the pedagogical competency of the teacher or that the supervisor did not know or recognize subject area competency in teachers.

The study provided evaluative statistical data in the area of instructor competency. The data supplied by the supervisors was provided from three different viewpoints (other teachers, tradesmen and their opinions). As a result of the independence from each other an interesting phenomena occured. The supervisor and tradesmen ratings were similar in the fact that they both indicated that the written portion of the trade competency examination related stronger to the instructor's competency than the performance portion. Again, in both, the performance test fell short of having a significant correlation with the

written test. Surprisingly, the teachers' viewpoint put a stronger emphasis on the performance portion of the OCE than on the written portion. These results were in opposition with the tradesmen's and supervisors' viewpoint results. The contradiction was that the tradesmen who relied on the performance of an individual, used the score from the written portion of the OCE for their competency indicator while the teachers who use the written (cognitive) portion of the OCE for pedagogical activities rely on the performance portion of the OCE.

Another unpredicted result was that a higher correlation was found on the written test than on the performance test when the teacher was rated on growth in competency after teaching experience. This indicated that teaching ability and task performance on the job had very low correlation. In addition a low negative correlation in the performance portion of the OCE resulted when supervisors were asked if the person's experience in the trade was adequate preparation to develop trade knowledge for teaching.

Recommendations

1. It is recommended that an investigation of the relationship between teacher competency and the opinions of students graduated from the course of study be made.

2. A study of the relationship between teacher competency and the opinions of employers of the graduated students should be completed.

3. Periodic and regular revisions of trade competency evaluations should be the result of input from occupational experts and not educational supervisors. These revisions should be accomplished under the guidance of a vocational educator.

4. The craft advisory committee should periodically observe the non-pedagogical performance of the teacher.

5. Trade competency evaluation processes and procedures should be analyzed to assure accurate measurement of the required competencies. In-service teaching should be periodically evaluated to assure utilization of competencies.

6. An in-service program for planned instructor updating, in the occupation, should be instituted in each school district.

7. Methods should be devised, on a multi-school district basis, to update the occupational skills and knowledges of instructors.

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APPENDIX A

The following questionnaire has been developed to assess subject area teaching success as a segregated educational element. It does not attempt to measure individual teaching ability or method, but rather direct the supervisor to consider certain areas which reflect a teacher's command of the subject. All information transmitted will be used in strict confidence. The person being rated by you was selected by a random method and in no way is this questionnaire a reflection on that person's background or ability.

Four categories have been identified to permit the grouping of questions in order to solicit comments. A 5 point rating scale accompanies each question, ranging from a high of five to a low of one. Circle the number which you feel is most appropriate. Please respond to each item. Thank you for your cooperation.

STUDENT PERFORMANCE:

1. His evaluation of student work reflects a quality of performance acceptable in his trade area.	5	4	3	2	1
2. He adequately answers student questions about his trade area.	5	4	3	2	1
3. Graduates of his course perform well on the job.	5	4	3	2	1
4. His students perform well in cooperative education situations.	5	4	3	2	1
5. He demonstrates the knowledge and ability to counsel his students for entry into the trade.	5	4	3	2	1
6. His students perceive him as knowledgeable in his trade area.	5	4	3	2	1

Comments:

CLASS ORGANIZATION:

1. Course reflects the sequence needed to develop qualified students in his trade area.	5	4	3	2	1
2. His classroom demonstrations are accurate in their portrayal of a real work setting.	5	4	3	2	1
3. Student assignments accurately reflect the trade area.	5	4	3	2	1

Comments:

SUPERVISOR RATING:

1. This vocational teacher is sufficiently competent in his respective trade area.	5	4	3	2	1
2. This person's years of experience in his trade were adequate preparation to develop his trade knowledge for teaching.	5	4	3	2	1
3. He appears to be more competent in his trade area now than he was when he began teaching.	5	4	3	2	1
4. The trade competency examination was adequate in identifying this person as a qualified tradesman for the teaching profession.	5	4	3	2	1

Comments:

PEER RELATIONSHIP:

1. His fellow teachers accept him as competent in his trade area.	5	4	3	2	1
2. Compared to other teachers in his area he is competent.	5	4	3	2	1
3. He is employed in his trade area on a part-time basis.	5	4	3	2	1
4. He keeps up with innovations and change in his trade area.	5	4	3	2	1
5. Tradesman in his area recognize him as competent.	5	4	3	2	1

Comments:

THE PENNSYLVANIA STATE UNIVERSITY
247 CHAMBERS BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Education
Department of Vocational Education

July 10, 1974

Dear Educator:

The Department of Vocational Education at The Pennsylvania State University is involved in research activities dealing with the validity of the Trade Competency Examinations. The attached instrument developed by the Department of Vocational Education will be utilized to assess subject area teaching success of beginning vocational education teachers by their respective supervisors.

You have been selected to judge the questionnaire. Review each item of the instrument. If you are a teacher judge the item by whether it would be a justifiable measure of your subject know-how. If you are a supervisor judge the item by whether it is a valid measure of a teacher's subject ability. Feel free to make any comment or revisions on the directions as well as the items. Please react to this questionnaire and return it in the envelope provided by July 19, 1974. Thank you very much for your expert opinions.

Sincerely yours,

S. T. Brantner
Associate Professor
Industrial Education

STB/pes
Enclosures

APPENDIX B

THE PENNSYLVANIA STATE UNIVERSITY
247 CHAMBERS BUILDING
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Education
Department of Vocational Education

October 14, 1974

Dear Supervisor:

The enclosed questionnaire has been developed to assess teacher subject knowledge as a segregated educational element. It does not attempt to measure individual teaching ability or method, but rather to consider certain activities which reflect a teacher's command of his subject.

You are to rate the subject knowledge of the teacher whose name appears on a label attached to the questionnaire. When the rating is completed, remove the label and return the questionnaire in the envelope provided. All information transmitted will be used in strict confidence. The teacher being rated by you was selected by a random method and in no way is this questionnaire a reflection on his background or ability.

Sincerely yours,

S. T. Brantner
Associate Professor
Industrial Education

STB/pes
Enclosures

THE PENNSYLVANIA STATE UNIVERSITY - DEPARTMENT OF VOCATIONAL EDUCATION

Directions:

We are trying to learn more about the subject matter knowledge of vocational teachers.

The following statements reflect some areas in which subject matter knowledge may be observed in varying degrees. Five catagories have been provided to standardize the rating: Below Average, Average, Above Average, Excellent, and Superior. Please indicate your response by marking [x] in the space which you feel is most appropriate.

THANK YOU FOR YOUR TIME AND COOPERATION

PLEASE MARK ALL ITEMS

		BELOW AVERAGE	AVERAGE	ABOVE AVERAGE	EXCELLENT	SUPERIOR
1.	His standards for student work reflect a quality of performance acceptable in his trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
2.	He adequately answers all student questions about his trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
3.	Graduates of his course perform well on the job.	[ ]	[ ]	[ ]	[ ]	[ ]
4.	His students perform well in cooperative education instruction.	[ ]	[ ]	[ ]	[ ]	[ ]
5.	He demonstrates the knowledge and ability to counsel his students for entry into the trade.	[ ]	[ ]	[ ]	[ ]	[ ]
6.	His students perceive him as knowledgeable in his trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
7.	Course of study reflects a sequence needed to develop qualified students in the trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
8.	His classroom demonstrations are accurate in their portrayal of a real work setting.	[ ]	[ ]	[ ]	[ ]	[ ]
9.	Student assignments accurately reflect the content of the trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
10.	This vocational teacher is competent in his respective trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
11.	This person's experience in his trade were adequate preparation to develop his trade knowledge for teaching.	[ ]	[ ]	[ ]	[ ]	[ ]
12.	He is more competent in his trade area now than when he began teaching.	[ ]	[ ]	[ ]	[ ]	[ ]
13.	The trade competency examination correctly identified this person as a qualified tradesman.	[ ]	[ ]	[ ]	[ ]	[ ]
14.	His fellow teachers accept him as competent in his trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
15.	Compared to other teachers in his area he is competent.	[ ]	[ ]	[ ]	[ ]	[ ]
16.	He keeps abreast of innovations and change in his trade area.	[ ]	[ ]	[ ]	[ ]	[ ]
17.	Tradesman in his area recognize him as competent.	[ ]	[ ]	[ ]	[ ]	[ ]